



HISTORICAL NOTE

The Hewitt airway – the first known artificial oral ‘air-way’ 101 years since its description

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The year 2008 marked 100 years since the publication of Sir Frederic W. Hewitt's description of his artificial airway. Hewitt's airway was the first known oral airway and laid the foundations for the numerous other airways that were later developed. Oral airways made anaesthesia safer and significantly reduced the trauma associated with earlier attempts at managing the obstructed airway.

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The development of the oropharyngeal airway is one of the lesser acknowledged advances in anaesthesia. It made anaesthesia safer and less traumatic. Trauma from attempts at airway control included damage to the tongue or teeth by tongue forceps, mouth props and mouth gags. Complete airway obstruction would have led to attempts at emergency tracheostomy. The use of airways also contributed to smoother general anaesthesia that was not punctuated by episodes of airway obstruction and hypoxia.

Sir Frederic W. Hewitt described his ‘air-way’ in 1908, some 60 years after the introduction of ether anaesthesia [1]. Early ether anaesthesia was light and airway obstruction was not common. However, the problem of airway obstruction or stertor was soon recognised. John Snow recommended that anaesthesia be lightened when airway obstruction occurred [2]. The other measures used to manage the airway include various postures, jaw-thrust, chin lift and pulling the tongue forward. The latter measure, effective in some cases, led to the development of a large number of mouth props and tongue forceps that caused considerable trauma to the teeth and tongue. Airway problems were studied in the 1880s and 1890s, and oropharyngeal tubes were used at that time for insufflation of the anaesthetic agent; however, it took several decades

before the oral airway was described as a device to maintain an airway.

Sir Frederic W. Hewitt

Sir Frederic William Hewitt (1857–1916) was ‘Anaesthetist to His Majesty the King; Physician–Anaesthetist to St. George's Hospital; Consulting Anaesthetist and Emeritus lecturer on Anaesthetics at the London Hospital’ (Fig. 1) [1].

Hewitt commenced his studies in medicine in 1880 at St George's Hospital. He was an outstanding student and received both the Brackenbury Prize in Medicine and the Treasurer's Prize. In 1884 he was appointed Anaesthetist to the Charing Cross Hospital. Other hospital appointments included the National Dental Hospital and the London Hospital. His reputation as an anaesthetist resulted in his appointment as Anaesthetist to the King in 1901. In 1902 he became Physician–Anaesthetist at St. George's Hospital. Also in 1902, Hewitt gave King Edward VII an anaesthetic for the drainage of an appendix abscess two days before his scheduled coronation (the coronation was delayed for six weeks). The surgeon was Sir Frederick Treves.

Hewitt developed the first fixed proportion nitrous oxide–oxygen machine, modifications of Junker's and



Figure 1 Sir Frederic W. Hewitt (1857–1916). Photograph courtesy of Wood-Library Museum, Park Ridge, Illinois, USA.

Clover's inhalers, mouth props and a mouth opener. He was a strong advocate of teaching anaesthesia in medical schools and maintaining high standards in clinical anaesthesia. He was author of 'Anaesthetics and their Administration' (first published in 1893) and 'The Administration of Nitrous Oxide and Oxygen for Dental Operations' (first published in 1897). Hewitt and Dudley William Buxton were the foremost British anaesthetists at the beginning of the twentieth century. Hewitt was knighted in 1911, the first anaesthetist to be so honoured. Hewitt died in 1916 of a gastric neoplasm. The fifth edition of 'Anaesthetics and their Administration' was published posthumously in 1922 with Dr Henry Robinson as editor. The Associated Anaesthetists of the United States of America and Canada held the Hewitt Memorial Week at their Congress in New York City in 1938. The First Frederic Hewitt Lecture was delivered at the Royal College of Surgeons of England in 1950 [3]. The Frederic Hewitt Lecture is now delivered biennially at the Anniversary meeting of the Royal College of Anaesthetists.

The Hewitt airway

Hewitt's paper [1] is remarkable for several reasons. He recognised that upper airway obstruction was a common problem during general anaesthesia and identified some conditions that were more likely to be associated with an obstructed airway. Hewitt also described the treatment of an obstructed airway and his new 'artificial air-way'.

Hewitt asserted that 'in most of the cases in which difficulties arise during general anaesthesia, these difficulties are directly dependent upon mechanically obstructed breathing.' This 'auto-asphyxia', as he termed it, 'is not infrequently mistaken for chloroform overdosage, surgical shock, or other conditions' [1].

'The upper air-passages of all subjects are liable to alterations in their conformation and calibre during general anaesthesia. This is specially noticeable in certain subjects, e.g., the thick-set and plethoric, whose upper air-passages are naturally narrow; in certain postures, e.g., the Trendelenburg, in which the tongue gravitates towards the palate; and in certain operations, e.g., rectal, which have a tendency reflexly to produce spasmodic tongue retraction. Everyone who has paid much attention to the clinical aspects of general anaesthesia knows how frequently he has to adopt some means for preserving a free air-way. In some cases the jaw must be pressed forwards or the chin pulled up continuously; in others, a mouth-prop adjusted to meet the special peculiarities of the case is required; whilst in others again it is necessary to apply tongue forceps in order to insure free breathing' [1].

Hewitt's airway consisted of a 'circular metal ring, with an internal diameter of half an inch, and a deep groove in its outer circumference to allow of the ring being held firmly by the teeth' [1]. A short metal collar protrudes into the mouth and carries a rubber tube with an internal diameter of half an inch and a maximum length of three and a quarter inches. The end of the rubber was cut obliquely and, when inserted, the opening should have faced the laryngeal inlet.

Hewitt further states that the airway is not to be used for every case, but mainly in cases of upper airway obstruction – when the breathing is 'laboured and noisy'. He also advises that a fairly deep level of anaesthesia is achieved before inserting the airway to avoid 'reflex retching and coughing'.

The airway was originally manufactured by Barth and Company, London. The illustration of the airway in Hewitt's original paper [1] shows a straight rubber tube (Fig. 2), while the illustration in the fifth edition of Hewitt's text [4] shows a curved rubber tube (Fig. 3). Fig. 4 shows a Hewitt airway from the collection of the Geoffrey Kaye Museum, Australian and New Zealand College of Anaesthetists, Melbourne, Australia.



Figure 2 Hewitt airway. Illustration from Hewitt's original description of his airway (1908).



Figure 3 Hewitt airway. Illustration from the 5th edition of Hewitt's text (1922).



Figure 4 Hewitt airway. Specimen in Geoffrey Kaye Museum, ANZCA, Melbourne, Australia.

Other oral airways

It is difficult to determine how rapidly this advance was incorporated into practice, but it probably took a few years. There was then a large increase in the variety of airways available. Around 30 airways were developed in the next two decades. Other airways with a metal 'bite

block' and a rubber tube include the Birt, Clausen, Hirsch and Phillips airways. The next major group of early airways was the metal airway. The Connell airway was the first metal airway and the Waters airway was the most popular metal airway. The third major group of airways was the 'wire airways' of Lumbard and its modifications.

Arthur Guedel described his airway in 1933 [5]. It was initially a rubber airway with a metal insert and was later made of plastic. The Berman airway [6] was the first airway designed to be made of plastic and was reusable after chemical sterilisation. The Guedel and Berman airways became the two most widely used airways for maintaining the airway.

The laryngeal mask airway, first described by Archie Brain in 1983 [7], and commercially available from 1988, has changed routine and emergency airway management. It has also enabled easy and reliable airway control for health care professionals outside the specialty of anaesthesia.

A more detailed historical account of oropharyngeal airways was presented by the author [8].

Other uses of airways

Oropharyngeal airways were initially used to overcome airway obstruction in unconscious patients. Later designs of airways also sought to provide protection of the airway (Shipway airway, Proseal laryngeal mask), assist in tracheal intubation (Berman Intubating airway, Williams airway, Patil airway, Ovassapian airway) and allow positive pressure ventilation (Laryngeal Mask airway).

Conclusion

Sir Frederic W. Hewitt was one of the foremost practitioners in anaesthesia. His development of the oropharyngeal airway helped make anaesthesia safer. Over the years oropharyngeal airways have saved countless lives. Hewitt's publication is one of the foundations of our control of the airway.

Acknowledgement

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